

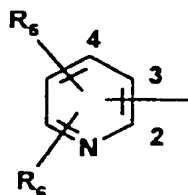
or an acid addition salt thereof, wherein the radicals R, R₁, R₂, R₃, R₄ and Z have the following meanings:

R represents

- (1) hydrogen, or
- (2) (C₁-C₄)-alkyl, wherein the alkyl group is optionally mono- or polysubstituted by a phenyl ring,
 which ring is optionally mono- or polysubstituted by halogen, (C₁-C₆)-alkyl, (C₃-C₇)-cycloalkyl, carbonyl groups, carboxyl groups esterified with (C₁-C₆)-alkanols, trifluoromethyl groups, hydroxyl groups, methoxy groups, ethoxy groups, benzyloxy groups and benzyl groups which are optionally mono- or polysubstituted on the phenyl moiety by (C₁-C₆)-alkyl groups, halogen atoms or trifluoromethyl groups;

R₁ represents

- (1) a phenyl ring which is mono- or polysubstituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy, hydroxyl, benzyloxy, nitro, amino, (C₁-C₆)-alkylamino, (C₁-C₆)-alkoxy-carbonylamino and by a carboxyl group or a carboxyl group esterified by a (C₁-C₆)-alcohol;
- (2) a pyridine structure of formula II:

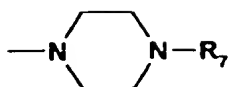


(II)

wherein the pyridine structure is alternatively bonded to the ring carbon atoms 2, 3 and 4 and is optionally substituted by R_5 and R_6 , which may be identical or different and represent (C_1-C_6) -alkyl, (C_3-C_7) cycloalkyl, (C_1-C_6) alkoxy, nitro, amino, hydroxyl, halogen, trifluoromethyl, an ethoxycarbonylamino radical and a carboxyalkyloxy group in which the alkyl group has 1-4 carbon atoms;

- (3) a 2- or 4-pyrimidinyl-heterocycle or a pyridylmethyl radical in which CH_2 is in the 2-, 3- or 4- position, wherein the 2- pyrimidinyl ring is optionally mono- or polysubstituted by a methyl group;
- (4) a 2-, 3- or 4-quinolyl structure substituted by (C_1-C_6) -alkyl, halogen, a nitro group, an amino group or a (C_1-C_6) -alkylamino radical;
- (5) a 2-, 3- or 4-quinolyl methyl group, wherein the ring carbons of the pyridylmethyl and quinolylmethyl radicals are optionally substituted by (C_1-C_6) -alkyl, (C_1-C_6) -alkoxy, nitro, amino and (C_1-C_6) -alkoxy-carbonylamino;
- (6) if R represents hydrogen or a benzyl group, R_1 can represent the acid radical of a natural amino acid, wherein the amino group of said amino acid is present in protected or unprotected form wherein if R_1 represents an asparagyl or a glutamyl radical having a second nonbonded carboxyl group, said nonbonded carboxyl group is present as a free carboxyl group or in the form of an ester with C_1-C_6 -alkanols;
- (7) an allylaminocarbonyl-2-methylprop-1-yl group; or

R_1 and R_2 together with the nitrogen atom to which they are bonded, form a piperazine ring of formula III:



(III)

or a homopiperazine ring if R_1 represents an aminoalkylene group, in which R_7 represents an alkyl radical, a phenyl ring which is optionally mono- or polysubstituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy, halogen, a nitro group, an amino function, (C₁-C₆)-alkylamino, benzhydryl group and bis-p-fluorobenzylhydryl group;

R_2 represents

- (1) hydrogen;
- (2) a (C₁-C₆)-alkyl group,

said alkyl group being optionally mono- or polysubstituted by halogen or a phenyl ring,

which ring is optionally mono- or polysubstituted by halogen, (C₁-C₆)-alkyl, (C₃-C₇)-cycloalkyl, carbonyl groups, carboxyl groups esterified with (C₁-C₆)-alkanols, trifluoromethyl groups, hydroxyl groups, methoxy groups, ethoxy groups, or benzyloxy groups;

or by a 2-quinolyl group or a 2-,3- or 4-pyridyl structure

which are optionally mono- or polysubstituted by halogen, (C₁-C₄)-alkyl groups or (C₁-C₄)-alkoxy groups;

- (3) an aroyl radical, wherein the aroyl moiety on which the radical is based is a phenyl ring which is optionally mono- or polysubstituted by halogen, (C₁-C₆)-alkyl, (C₃-C₇)-cycloalkyl, carbonyl groups, carboxyl groups esterified with (C₁-

C₆)-alkanols, trifluoromethyl groups, hydroxyl groups, methoxy groups, ethoxy groups, or benzyloxy groups;

R₃ and R₄, which are identical or different, represent hydrogen, hydroxyl, (C₁-C₆)-alkyl, (C₃-C₇)-cycloalkyl, (C₁-C₆)-alkanoyl, (C₁-C₆)-alkoxy, halogen, benzoxy, a nitro group, an amino group, a (C₁-C₄)-mono- or dialkyl substituted amino group, a (C₁-C₃)-alkoxycarbonylamino function or a (C₁-C₃)-alkoxycarbonylamino-(C₁-C₃)-alkyl function; and

Z represents O or S;

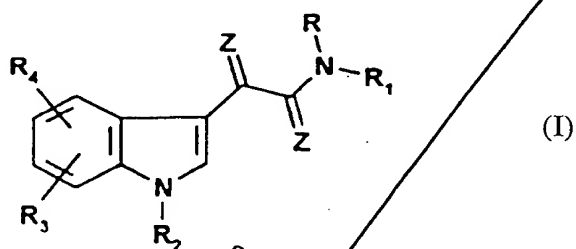
wherein alkyl, alkanol, alkoxy and alkylamino groups may be straight chained or branched.

10. The N-substituted indol-3-glyoxylamide of claim 9 wherein R is hydrogen or a benzyl group and R₁ is the acid radical of an amino acid selected from the group consisting of α -glycyl, α -alanyl, α -leucyl, α -isoleucyl, α -seryl, α -phenylalanyl, α -histidyl, α -prolyl, α -arginyl, α -lysyl, α -asparagyl and α -glutamyl.

11. The N-substituted indol-3-glyoxylamide of claim 10 wherein R represents hydrogen or a benzyl group and R₁ represents α -asparagyl or α -glutamyl, in which the nonbonded carboxyl group is a methyl, ethyl or tert-butyl ester.

9/12. The N-substituted indol-3-glyoxylamide of claim 2 wherein R represents hydrogen or a benzyl group and R₁ represents the acid radical of a natural amino acid protected by a carbobenzoxy radical, a tert-butoxycarbonyl radical or an acetyl group.

13. A method of treating asthma and/or allergy in a mammal comprising the step of administering to said mammal a treatment-effective amount of a compound of formula I:



or an acid addition salt thereof, wherein the radicals R, R₁, R₂, R₃, R₄ and Z have the following meanings:

R represents

- (1) hydrogen, or
- (2) (C₁-C₄)-alkyl, wherein the alkyl group is optionally mono- or polysubstituted by a phenyl ring,

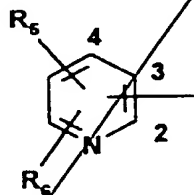
which ring is optionally mono- or polysubstituted by halogen, (C₁-C₆)-alkyl, (C₃-C₇)-cycloalkyl, carbonyl groups, carboxyl groups esterified with (C₁-C₆)-alkanols, trifluoromethyl groups, hydroxyl groups, methoxy groups, ethoxy groups, benzyloxy groups and benzyl groups which are optionally

49

mono- or polysubstituted on the phenyl moiety by (C₁-C₆)alkyl groups,
halogen atoms or trifluoromethyl groups;

R₁ represents

- (1) a phenyl ring which is mono- or polysubstituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy, hydroxyl, benzyloxy, nitro, amino, (C₁-C₆)-alkylamino, (C₁-C₆)-alkoxy-carbonylamino and by a carboxyl group or a carboxyl group esterified by a (C₁-C₆)-alkanol;
- (2) a pyridine structure of formula II:



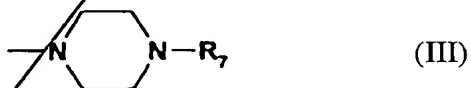
(II)

wherein the pyridine structure is alternatively bonded to the ring carbon atoms 2, 3 and 4 and is optionally substituted by R₅ and R₆, which may be identical or different and represent (C₁-C₆)-alkyl, (C₃-C₇) cycloalkyl, (C₁-C₆)alkoxy, nitro, amino, hydroxyl, halogen, trifluoromethyl, an ethoxycarbonylamino radical and a carboxyalkyloxy group in which the alkyl group has 1-4 carbon atoms;

- (3) a 2- or 4-pyrimidinyl-heterocycle or a pyridylmethyl radical in which CH₂ is in the 2-, 3- or 4- position, wherein the 2- pyrimidinyl ring is optionally mono- or polysubstituted by a methyl group;
- (4) a 2-, 3- or 4-quinolyl structure substituted by (C₁-C₆)-alkyl, halogen, a nitro group, an amino group or a (C₁-C₆)-alkylamino radical;

- (5) a 2-, 3- or 4-quinolyl methyl group, wherein the ring carbons of the pyridylmethyl and quinolylmethyl radicals are optionally substituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy, nitro, amino and (C₁-C₆)-alkoxy-carbonylamino;
- (6) if R represents hydrogen or a benzyl group, R₁ can represent the acid radical of a natural amino acid, wherein the amino group of said amino acid is present in protected or unprotected form wherein if R₁ represents an asparagyl or a glutamyl radical having a second nonbonded carboxyl group, said nonbonded carboxyl group is present as a free carboxyl group or in the form of an ester with C₁-C₆-alkanols;
- (7) an allylaminocarbonyl-2-methylprop-1-yl group; or

R₁ and R, together with the nitrogen atom to which they are bonded, form a piperazine ring of formula III:



or a homopiperazine ring if R₁ represents an aminoalkylene group, in which R₇ represents an alkyl radical, a phenyl ring which is optionally mono- or polysubstituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy, halogen, a nitro group, an amino function, (C₁-C₆)-alkylamino, benzhydryl group and bis-p-fluorobenzhydryl group;

R₂ represents

- (1) hydrogen;

(2) a (C₁-C₆)-alkyl group,

said alkyl group being optionally mono- or polysubstituted by halogen
or a phenyl ring,

which ring is optionally mono- or polysubstituted by halogen, (C₁-C₆)-
alkyl, (C₃-C₇)-cycloalkyl, carbonyl groups, carboxyl groups esterified
with (C₁-C₆)-alkanols, trifluoromethyl groups, hydroxyl groups,
methoxy groups, ethoxy groups, or benzyloxy groups;

or by a 2-quinolyl group or a 2-,3- or 4-pyridyl structure

which are optionally mono- or polysubstituted by halogen, (C₁-C₄)-
alkyl groups or (C₁-C₄)-alkoxy groups;

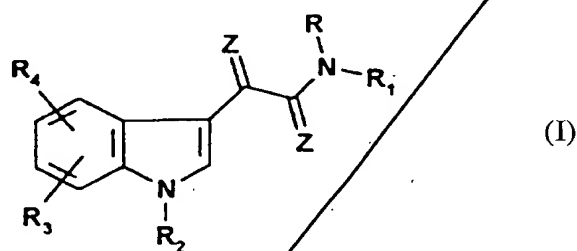
(3) an aroyl radical, wherein the aroyl moiety on which the radical is based is a
phenyl ring which is optionally mono- or polysubstituted by halogen, (C₁-C₆)-
alkyl, (C₃-C₇)-cycloalkyl, carbonyl groups, carboxyl groups esterified with (C₁-
C₆)-alkanols, trifluoromethyl groups, hydroxyl groups, methoxy groups, ethoxy
groups, or benzyloxy groups;

R₃ and R₄, which are identical or different, represent hydrogen, hydroxyl, (C₁-C₆)-alkyl, (C₃-
C₇)-cycloalkyl, (C₁-C₆)-alkanoyl, (C₁-C₆)-alkoxy, halogen, benzoxy, a nitro group, an
amino group, a (C₁-C₄)-mono- or dialkyl substituted amino group, a (C₁-C₃)-
alkoxycarbonylamino function or a (C₁-C₃)-alkoxycarbonylamino-(C₁-C₃)-alkyl
function; and

Z represents O or S;

wherein alkyl, alkanol, alkoxy and alkylamino groups may be straight chained or branched.

14. A method of inducing regression of an immunological reaction in a mammal comprising the step of administering to said mammal an effective amount of a compound according to formula I:



or an acid addition salt thereof, wherein the radicals R, R₁, R₂, R₃, R₄ and Z have the following meanings:

R represents

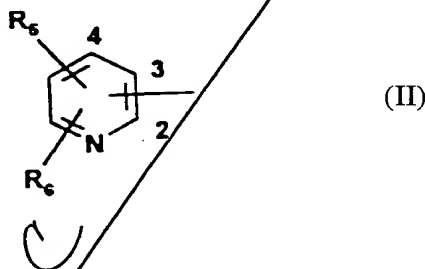
- (1) hydrogen, or
- (2) (C₁-C₄)-alkyl, wherein the alkyl group is optionally mono- or polysubstituted by a phenyl ring,

which ring is optionally mono- or polysubstituted by halogen, (C₁-C₆)-alkyl, (C₃-C₇)-cycloalkyl, carbonyl groups, carboxyl groups esterified with (C₁-C₆)-alkanols, trifluoromethyl groups, hydroxyl groups, methoxy groups, ethoxy groups, benzyloxy groups and benzyl groups which are optionally

mono- or polysubstituted on the phenyl moiety by (C₁-C₆)alkyl groups,
halogen atoms or trifluoromethyl groups;

R₁ represents

- (1) a phenyl ring which is mono- or polysubstituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy, hydroxyl, benzyloxy, nitro, amino, (C₁-C₆)-alkylamino, (C₁-C₆)-alkoxy-carbonylamino and by a carboxyl group or a carboxyl group esterified by a (C₁-C₆)-alcohol;
- (2) a pyridine structure of formula II:

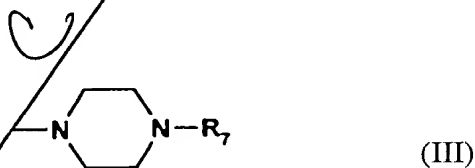


wherein the pyridine structure is alternatively bonded to the ring carbon atoms 2, 3 and 4 and is optionally substituted by R₅ and R₆, which may be identical or different and represent (C₁-C₆)-alkyl, (C₃-C₇) cycloalkyl, (C₁-C₆)alkoxy, nitro, amino, hydroxyl, halogen, trifluoromethyl, an ethoxycarbonylamino radical and a carboxyalkyloxy group in which the alkyl group has 1-4 carbon atoms;

- (3) a 2- or 4-pyrimidinyl-heterocycle or a pyridylmethyl radical in which CH₂ is in the 2-, 3- or 4- position, wherein the 2- pyrimidinyl ring is optionally mono- or polysubstituted by a methyl group;
- (4) a 2-, 3- or 4-quinolyl structure substituted by (C₁-C₆)-alkyl, halogen, a nitro group, an amino group or a (C₁-C₆)-alkylamino radical;

- (5) a 2-, 3- or 4-quinolyl methyl group, wherein the ring carbons of the pyridylmethyl and quinolylmethyl radicals are optionally substituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy, nitro, amino and (C₁-C₆)-alkoxy-carbonylamino;
- (6) if R represents hydrogen or a benzyl group, R₁ can represent the acid radical of a natural amino acid, wherein the amino group of said amino acid is present in protected or unprotected form wherein if R₁ represents an asparagyl or a glutamyl radical having a second nonbonded carboxyl group, said nonbonded carboxyl group is present as a free carboxyl group or in the form of an ester with C₁-C₆-alkanols;
- (7) an allylaminocarbonyl-2-methylprop-1-yl group; or

R₁ and R, together with the nitrogen atom to which they are bonded, form a piperazine ring of formula III:



or a homopiperazine ring if R₁ represents an aminoalkylene group, in which R₇ represents an alkyl radical, a phenyl ring which is optionally mono- or polysubstituted by (C₁-C₆)-alkyl, (C₁-C₆)-alkoxy, halogen, a nitro group, an amino function, (C₁-C₆)-alkylamino, benzhydryl group and bis-p-fluorobenzylhydryl group;

R₂ represents

- (1) hydrogen;

(2) a (C₁-C₆)-alkyl group,

said alkyl group being optionally mono- or polysubstituted by halogen
or a phenyl ring,

which ring is optionally mono- or polysubstituted by halogen, (C₁-C₆)-
alkyl, (C₃-C₇)-cycloalkyl, carbonyl groups, carboxyl groups esterified
with (C₁-C₆)-alkanols, trifluoromethyl groups, hydroxyl groups,
methoxy groups, ethoxy groups, or benzyloxy groups;

or by a 2-quinolyl group or a 2-,3- or 4-pyridyl structure

which are optionally mono- or polysubstituted by halogen, (C₁-C₄)-
alkyl groups or (C₁-C₄)-alkoxy groups;

(3) an aroyl radical, wherein the aroyl moiety on which the radical is based is a
phenyl ring which is optionally mono- or polysubstituted by halogen, (C₁-C₆)-
alkyl, (C₃-C₇)-cycloalkyl, carbonyl groups, carboxyl groups esterified with (C₁-
C₆)-alkanols, trifluoromethyl groups, hydroxyl groups, methoxy groups, ethoxy
groups, or benzyloxy groups;

R₃ and R₄, which are identical or different, represent hydrogen, hydroxyl, (C₁-C₆)-alkyl, (C₃-
C₇)-cycloalkyl, (C₁-C₆)-alkanoyl, (C₁-C₆)-alkoxy, halogen, benzoxy, a nitro group, an
amino group, a (C₁-C₄)-mono- or dialkyl substituted amino group, a (C₁-C₃)-
alkoxycarbonylamino function or a (C₁-C₃)-alkoxycarbonylamino-(C₁-C₃)-alkyl
function; and

Z represents O or S;